

Rocks, rats and cats: a survey for small mammals in native grasslands on farms across the Victorian Volcanic Plain

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Abstract

Mammal surveys were conducted at 16 farms on the Victorian Volcanic Plain, as part of a study on native grassland biodiversity. One hundred and forty-six hair tubes/funnels were laid at the 16 farms. Elliott traps were laid only at one farm, for 27 trap nights, in a small area with active disturbance indicative of the Swamp Rat *Rattus lutreolus*. No evidence of any small native mammals was discovered using hair tubes, funnels or Elliott traps. The only hair recovered was from a Cat *Felis catus*. These results are discussed from the perspective of small mammal decline on the Victorian Volcanic Plain and its ecological implications. Improved methods for detection of elusive grassland mammals are suggested. (*The Victorian Naturalist* 126 (2) 2009, 44–50)

Keywords: Elliott trapping, *Faunatech* hair funnels, hair-tube sampling, *Rattus lutreolus*, Western Basalt Plain.

Introduction

The native grassland of the Victorian Volcanic Plain (VVP) bioregion is a critically endangered ecosystem (EPBC 1999). Until recently, the extent and quality of native grassland across the VVP was largely unknown. Although only 0.5% is protected in reserves, recent mapping and research indicates that ecologically significant grasslands occur across the private estate (Barlow and Ross 2001; Williams *et al.* 2005; Turner and Zimmer 2007; Zimmer *et al.* 2008). The decline in the distribution of native grasslands has been driven by agricultural expansion (Stuwe 1986) and urban development (Williams *et al.* 2005). The associated decline in small ground-dwelling mammals on the VVP has been attributed to three main causes: habitat modification, impact of introduced mammals, and direct killing (Bennett 1982). Habitat preferences of small ground-dwelling mammals are commonly based on vegetation structure (Moro 1991; Dufty 1994; Catling *et al.* 2000); the greater the structural complexity, the greater the diversity of fauna supported (Michael *et al.* 2004). Agricultural intensification of landscapes has led to a decline in this ecological complexity (Benton *et al.* 2003).

Since 2003 the authors have been studying the floristic and structural responses of native grasslands to sheep grazing on the VVP. The 'long-term ecological grazing project' has two

main elements: (1) a network of 13 'Plains-Tender' farms (private properties) where several grazing-rest treatments are trialled at the paddock-scale and (2) three experimental sites where six grazing-rest treatments are imposed within a system of 15 m × 15 m plots (Fig. 1). In spring 2005, it was noticed that plots undergoing grazing rest periods of ≥ 6 months per year were grossly disturbed at two of the experimental sites, Hamilton in the west and Birregurra in the east (~150 km apart) (Fig. 2). Local experts suggested that the system of tunnels and runways beneath mature Kangaroo Grass *Themeda triandra* tussocks were created by the native Swamp Rat *Rattus lutreolus*. The disturbance has persisted only at the Hamilton site. In spring 2007, the authors decided to use the rare opportunity of access to 16 private properties across the VVP to conduct a general survey for small mammals. As well, the authors were determined to discover whether or not plot disturbances were a result of the activities of the Swamp Rat.

Historically, the VVP, previously known as the Western Basalt Plain, was home to a variety of small mammals (Seebeck 1984). The sub-fossil record reflects a diverse mammal fauna of 42 species (Wakefield 1964), but far fewer are extant on the VVP (Taylor *et al.* 2003). Although a range of native rats and mice were

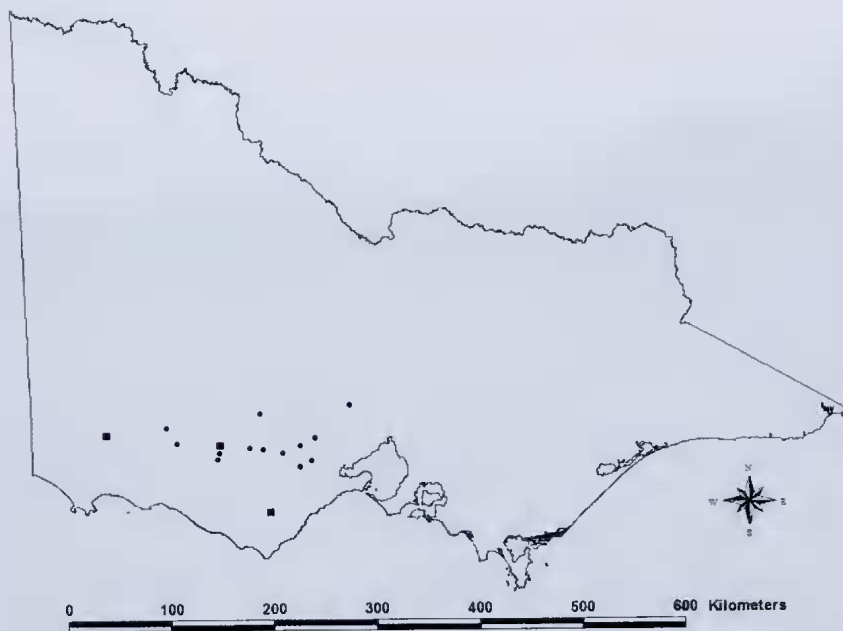


Fig. 1. Map of Victoria showing locations of study farms • and experimental sites ■

once present in all major habitat types of the plain, several species became extinct within the first few years of settlement (150 years ago) (Seebeck 1984), including a species now known to be Long-eared Mouse *Pseudomys auritus* (Medlin 2008) (formerly described as Plains Rat *Pseudomys australis*, Mahoney and Richardson 1988, although see Williams and Menkhurst 1995) and an undescribed large *Pseudomys* (Seebeck 1984). Small native ground-dwelling mammals recorded on the plains in the early 1900s include the monotreme, Echidna *Tachyglossus aculeatus*, several dasyurid marsupials (Spotted-tailed Quoll *Dasyurus maculatus*, Eastern Quoll *Dasyurus viverrinus*, Fat-tailed Dunnart *Sminthopsis crassicaudata*), Eastern Barred Bandicoot *Perameles gunii* and Swamp Rat *Rattus lutreolus* (Bennett 1982), all of which were reported to have undergone decline or local extinction in the Woolsthorpe area of the plain (Bennett 1982). Today, the Spotted-tailed Quoll has a much reduced range on the VVP, restricted to the Otway Range and the Mt Eccles-Lake Condah area (Fleay 1932, Belcher *et al.* 2008). The Eastern Quoll, alongside a larger mammal, the Common Wombat *Vombatus ursinus*, became extinct on the plain relatively recently (i.e. 1950s) (Seebeck 1984).

In the mid-1970s, Emison *et al.* (1975) asserted that the VVP grasslands were inhabited by approximately eight species of mammal, four of which used grassland as primary habitat: Fat-tailed Dunnart, Eastern Barred Bandicoot, the introduced Hare *Lepus capensis* and House Mouse *Mus musculus*. More recently, a study of mammal fauna in native grasslands on farms on the VVP, undertaken in 1995-1996, documented the occurrence of only two native small mammal species, Fat-tailed Dunnart and Common Dunnart *S. murina* (Hadden 2002).

Methods

Faunatech hair funnels were laid in 28 native grassland paddocks (on 13 farms) undergoing grazing-rest treatments. *Faunatech* hair funnels are resistant to damage from stock; they are cone shaped, baited at the tapered end and have a removable sticky surface inside. The hair funnels were placed close to permanent vegetation sampling transects. On average, three funnels were used per paddock. They were laid during October 2007 for approximately two weeks, after which they were collected, and the sticky surfaces removed, analysed for hairs and sent to Barbara Triggs for identification.



Fig. 2. Disturbance attributed to Swamp Rats, Hamilton, August 2006

The Victorian Naturalist

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Volume 125, 2008

Compiled by KN Bell

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Orange Lacewing butterfly. Photo by Dan Carey Photography.